ROUTING AND TRANSMITTAL SLIP

Date 12/29

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. ADDA		29 DEC 1986
2. DDA		30 DEC 1986
3.		
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5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

These standards and statements of direction represent a tremendous amount of hard work and coordination. All are industry mainstream. Nice work.

STAT
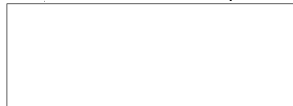
DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

TRANSMITTAL SLIP

TO:	DDA

ROOM NO.	BUILDING
7D24	Hqs.

REMARKS:

FROM: D/OIT

ROOM NO.	BUILDING	EXTENSION
2D00	Hqs.	

FORM NO. 241
1 FEB 56

REPLACES FORM 36-8
WHICH MAY BE USED.

(47)

OIT 1053-86

24 DEC 1986

MEMORANDUM FOR: Executive Director

VIA: Deputy Director for Administration

FROM: Edward J. Maloney
                  Director of Information Technology

SUBJECT: OIT Standards

1.   Attached are OIT Statements of Direction for Network Architecture and Terminal and Workstation Protocol, and OIT Standards for Document Interchange Format, Electronic Mail Interchange, 3270 Protocol for Terminals and Workstations and Database Management System Data Language.

2.   These Statements of Direction and Standards have received unanimous approval from the Customer/Standards Committee. I would like to thank the members of the committee, whose assistance and patience in the coordination of multiple drafts were invaluable.

3.   I have personally reviewed all of these Statements of Direction and Standards, and I believe that their adoption will increase the effectiveness of Agency computing by improving our ability to share information through interconnected Agency computing systems and to utilize vendor-developed solutions to our problems. Therefore, I adopt them as OIT Statements of Direction and OIT Standards.

4.   These Statements of Direction and Standards will be formally published and we will prepare a Headquarters Notice announcing their availability by early February 1987. In addition, we will brief ADP Control Officers and coordinate with the Office of Logistics to develop language suitable for inclusion in Agency Requests for Proposal and resulting contracts. We will also provide consulting and assistance to our customer, contractor, and vendor communities to ensure an understanding of and compliance with the Standards.

25X1

Edward J. Maloney

Attachments:
  As Stated

5-0-1

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OIT Statement of Direction
Network Architecture

10/27/86

1. Summary

1.1 This is the OIT statement of direction for network architecture, covering the overall architecture of connections of computer systems, workstations and terminals with OIT mainframe computer systems. The direction is System Network Architecture (SNA), an IBM-defined network architecture.

1.2 It is OIT's ultimate intent to adopt the Open Systems Interconnect (OSI) network architecture, an international standard, although OIT's current plan is to implement SNA, as explained in this Statement. The reasons for the adoption of SNA as the present direction, and the status of OSI and OIT's plans for OSI, are presented here.

1.3 The need for this statement of direction is discussed, applicable candidates are reviewed, and the selected approach is presented. Intentions regarding the applicability of this direction and planned OIT standards and implementation responsibility are given.

2. Need for this Statement of Direction

2.1 OIT is presently defining strategic interfaces dealing with OIT computer systems. However, those interfaces cannot be defined independently; choices of one interface can affect the choices that can be made for another interface. There are presently two candidate network architectures, the Open System Interconnect (OSI) model defined by the Comite Consultatif Internationale Telegraphique et Telephonique (CCITT), and SNA as defined by IBM.

2.2 The choices of interfaces such as form of document, mail systems, workstation and terminal connection must all be made within a single network architecture. Thus, there is a need to select a network architecture.

2.3 OIT presently does not employ a single network architecture; rather, selections of communications methods are based on the specific requirements for each situation. However, the present experience indicates a need for a set of integrated network software. The network control features that become available with the adoption of a single network architecture are one benefit of such an approach; another benefit is the ability to make wider use of standard software products. The interoperability of OIT systems with other networks will also be improved by the use of a single OIT network architecture.

2.4 The adoption of a network architecture direction will provide a framework for the planning of OIT systems, as well as enable the selection of an integrated, functionally complete set of products based on that architecture.

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OIT Statement of Direction
Network Architecture

2.5 OIT customers and vendors also need a clear statement of OIT's long-term direction with respect to network architectures, so that they can make appropriate plans for their systems that will interface with OIT systems.

3. Candidate Standards

3.1 The leading candidate is SNA from IBM. SNA is completely supported throughout IBM's product line. Because of IBM's market position, many vendors other than IBM have developed SNA interfaces. There are also a growing number of "bridge" products, developed specifically to permit non-IBM products to interface to SNA networks. Thus, SNA is a network architecture that has become a de facto industry standard.

3.2 The OSI approach has the advantage of being defined by an established, vendor-independent standards organization. There is considerable activity to complete the definition of the OSI architecture and develop OSI products. There is also a clear tendency among Government organizations to adopt the OSI architecture. However, at this time the OSI model as defined has a large number of open areas, and there is not complete set of products implementing the OSI model available to run with OIT's IBM mainframe computer systems.

3.3 Although the OSI and SNA choices present a clear dichotomy at this time, it is not expected that the differences between the two approaches will continue to be as great as they are today. There are industry trends toward the convergence of the OSI and SNA network architectures, as well as bridge products to connect the two network types. There is also some movement on IBM's part toward OSI support. Thus, the selection of SNA as a single network architecture at this time is expected to facilitate the later adoption of the OSI network model, by providing a consistent base for the transition.

4. Direction

4.1 SNA is OIT's direction. Although SNA is an architecture developed by a single vendor rather than a standard promulgated by an official standards body, its adoption will not increase our reliance on IBM as a supplier. In fact, because of its wide vendor acceptance, its adoption will tend to increase our ability to integrate a multi-vendor computer environment.

4.2 OIT intends to change its direction to OSI when mature, fully functional OSI products become available as industry mainstream products. There is no way to estimate how quickly that change in direction will occur, however, or how the transition to OSI will be accomplished.

4.3 For further information about SNA and OSI, see the references.

5. Applicability

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OIT Statement of Direction
Network Architecture

5.1 OIT's intention is to define a set of strategic interfaces within the SNA architecture, such as electronic mail interchange, document format, terminal and workstation connectivity. As these interfaces are defined and implemented, all connections between computer systems, workstations and terminals and OIT mainframe computer systems will be required to conform to interface standards within SNA.

5.2 This statement of direction is provided so that OIT customers and vendors can understand OIT's future direction, and make appropriate plans for future systems that interface with OIT systems.

6. Implementation

6.1 OIT will develop a set of standards for strategic interfaces within the SNA architecture.

6.2 SNA includes a very large product set; OIT will select products from that set to provide network services. Not all products that are compatible with SNA will necessarily be supported by OIT.

6.3 OIT will continue to monitor the progress of the OSI architecture.

7. References

7.1 Systems Network Architecture Reference Summary, IBM Corporation, Technical Publication GA27-3136.

7.2 Systems Network Architecture Technical Overview, IBM Corporation, Technical Publication GC30-3073.

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OIT Standard
Electronic Mail Interchange

10/6/86

1. Summary

1.1·This is the OIT Standard for protocols and data streams used for electronic mail interchange between OIT mainframe computer systems and other computer systems and between OIT mainframe computer systems and workstations. The standard for transfers between OIT mainframe computer systems and other computer systems is IBM's System Network Architecture Distribution Services (SNADS); the standard for transfer between OIT mainframe computer systems and workstations is IBM's Document Interchange Architecture (DIA).

1.2 This standard covers the protocols used to exchange electronic mail.

1.3 The need for this standard is discussed, applicable potential standards are reviewed, and the standard is presented. The applicability, effective date and implementation of the standard are specified. References are provided.

2. Need for this Standard

2.1 This standard is needed because of the adoption of workstations instead of terminals and because of the present and planned use of departmental-level computers with mail systems.

2.2 Workstation computer systems are increasingly being used in place of terminals within the Agency. Workstations offer the potential of using computing capability on the user's desk to offer an efficient, user-friendly interface to a mail system, as well as shifting part of the workload from OIT mainframes to the workstation. However, an interface is required that permits the interchange of mail between cooperating programs in the mainframe and workstation.

2.3 The Agency has operational and planned computer systems that include electronic mail systems. Among these are Wang networks employed throughout the DDS&T and DDO, the Improved NPIC System now under development and the FBIS AFS System. In each case, these computer systems provide electronic mail services to their users, but these mail systems cannot exchange mail with each other. Electronic mail is becoming increasingly important for an ever-wider group of administrative and other services, as well as an important communications method for Agency personnel. The need for Agency-wide access to electronic mail service is apparent. The adoption of a standard for the protocols and data streams that are employed for the exchange of electronic mail between Agency computer systems will enable mail interfaces to be developed that interconnect these computer systems.

2.4 Using the IBM approach, the workstation-to-mail system interface and the mail system-to-mail system interface are performed by products meeting different specifications. The workstation-to-mail system

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OIT Standard
Electronic Mail Interchange

interface allows a single user to log on, pick up and send mail, and log off. That interface can be used as a mail system-to-mail system interface, but it would be cumbersome, since one mail system would have to log on, pretending to be each of its users, ask for mail, and log off. A more appropriate mail system-to-mail system interface allows one mail system to log on and pick up all mail for all of its users in a single operation.

3. Candidate Standards

3.1 There are several candidate standards. IBM's System Network Architecture includes SNADS, a mail system-to-mail system interface, and DIA, a user-to-mail system interface. The set of international standards developed by the CCITT includes a standard for electronic mail, X.400.

3.2 X.400 cannot be used with IBM mainframe systems at this time because it assumes end-to-end X.25 transport services, that are not available for IBM mainframes. In addition, it is not mature enough for adoption as a standard at this time. There are still several areas that are in active consideration for modification, and products based on X.400 are not widely available.

3.3 The SNA standards for electronic mail interchange, DIA and SNADS, are specified and have been implemented successfully. They have also been accepted by a variety of vendors of computer systems, so that DIA and SNADS are becoming de facto industry standards. These standards are supported by IBM on MVS and VM, by Digital Equipment Corporation minicomputers, Data General minicomputers, Wang systems and other vendors. No other standard for exchange of electronic mail is supported by such a large number of vendors.

4. Standard

4.1 SNADS is the standard for electronic mail interchange between mail systems, and DIA is the selected standard for mail interchange between a mail system and a workstation.

4.2 Although SNADS and DIA are product architectures from a single vendor, rather than a standard promulgated by an official standards organization, their adoption will not increase our reliance on IBM as a supplier. In fact, because of their wide vendor acceptance, this standard will improve our ability to integrate a multi-vendor office systems environment.

5. Test Standard

5.1 The current version of the IBM product DISOSS is the test standard for compliance with this standard.

6. Applicability of the Standard

6.1 This standard is applicable to all electronic mail transfers between

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OIT Standard
Electronic Mail Interchange

OIT mainframe computer systems and workstations and computer systems. All such transfers will take place using the protocols and data streams of SNADS and DIA.

6.2 This standard restricts the acquisition of computer systems that will exchange electronic mail with OIT mainframe computer systems to those that implement SNADS. Every computer system that is acquired that is to make electronic mail exchanges with OIT mainframe computer systems must conform to this standard.

6.3 Existing connections that do not comply with this standard are exempt from compliance until major upgrades are made. When a major upgrade is made to any connection that is exempt from this standard, that connection must be brought into compliance.

6.4 New connections with OIT systems for exchange of electronic mail will not be made unless the connecting systems conform to this standard.

7. Effective Date

7.1 This standard is effective immediately.

8. Implementation

8.1 Before any electronic mail system is connected to OIT mainframe computer systems, the sponsoring component must provide a demonstration of compliance with this standard.

8.2 OIT will establish appropriate validation criteria and provide a point of contact for demonstrating product compliance with this standard.

8.3 OIT will furnish programs to interface with connecting computer systems according to SNADS and DIA protocols and data streams as required.

9. References

9.1 Document Interchange Architecture: Concepts and Structures, IBM Publication # SC23-0759.

9.2 SNADS Format and Protocol Reference, IBM Publication #SC30-3112.

9.3 Distributed Office Support System/370, Version 3.2: Architecture Reference for Document Interchange Units and SNADS Interchange Units.

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OIT Standard
Document Interchange Format

12/19/86

1. Summary

1.1 This is the OIT Standard for the form of a document exchanged between OIT mainframe computer systems and other computer systems. The standard is Document Content Architecture (DCA), as defined by IBM. This standard covers documents that consist of text only.

1.2 The need for this standard is discussed, applicable potential standards are reviewed, and the recommended standard is presented. The applicability of the standard and OIT implementation responsibility are given.

2. Need for a Document Format Standard

2.1 Using Agency word processing systems, there are today a number of different methods that can be employed to produce a document. These include HBWP, AIM, Wang word processors (several types), NBI word processors, personal computers (principally IBM) using a variety of commercial word processing programs, and soon IBM 3270/AT's running PC word processing programs.

2.2 With these different methods of document composition, in some cases a document produced using one method cannot be edited with another. In other cases, a document produced using one word processor must be transformed into a text file before being edited by another, resulting in the loss of formatting information. This problem will become more severe when personal computer word processors are used; without a standard form of document, it may be impossible for a Delta Data user to edit a document produced on a 3270/AT running OIT-sanctioned word processing software.

2.3 The adoption of a standard document format, and the implementation of programs to transform documents from all present document preparation systems into that standard form and back, will allow for document interchange among all OIT-sanctioned word processing methods (note, however, that some loss of formatting controls following a transformation will occur). In addition, through the implementation of programs to print documents in DCA format, documents produced on any OIT-supported word processor will be printable on any OIT-supported printer.

3. Candidate Standards

3.1 The leading candidate standard is Document Content Architecture (DCA) from IBM. Because of IBM's support for this standard throughout their product line, and because DCA is the first widely applicable document standard that has been completely implemented, it is rapidly becoming a de facto industry standard.

3.2 DCA is supported by a variety of microcomputer and workstation word

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OIT Standard
Document Interchange Format

processing programs, including Multimate, Microsoft Word and Alis. DCA is also supported by several minicomputer systems from the leading office systems vendors, including DEC and Data General. Many software and minicomputer suppliers who do not already support DCA are announcing their intention to support it.

3.3 A competing alternative, in use at the Agency for some time, is Waterloo Script. Waterloo Script is used by VM installations for VM word processing and document exchange. Present OIT systems support the creation, transmission, editing and printing of documents in Waterloo Script. Waterloo Script has rich functional capabilities; unfortunately, it does not enjoy vendor support outside the VM environment.

4. Standard

4.1 IBM's Document Content Architecture is the selected standard. Although DCA is a product specification from a single vendor, rather than a standard promulgated by an official standards organization, its adoption will not increase our reliance on IBM as a supplier. In fact, because of its wide vendor acceptance, its adoption will tend to increase our ability to integrate a multi-vendor office systems environment.

4.2 There is no other standard for document format that enjoys acceptance by such a wide range of vendors, with so many bridge products available.

4.3 There are two DCA formats, called Revisable Form Text and Final Form Text. Because it allows for further editing and Final Form does not, Revisable Form is the standard for documents that can be revised, Final Form is the standard for documents that are not to receive further revision.

4.4 For further information about DCA, see the references.

4.5 Although DCA is the standard for interchange of documents between computer systems, and DCA is a required capability for all word processing hardware and software that is sanctioned and supported by OIT, two optional methods of document interchange will also receive limited support from OIT: native file exchange and text file exchange.

4.6 "Native file" format is the document file that is normally produced by a word processor when no transform is applied to the file it produces. Typically, each company's products, hardware or software, have a unique native file format that is produced. The transfer of documents in native format between computer systems will be supported by OIT as a transfer only; no printing or transform capabilities will be provided. The ability to transfer this format between computer systems will allow the transfer of documents between users of the same word processor without an intervening transformation.

4.7 "Text file" format is a flat file, one record per line of text,

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OIT Standard
Document Interchange Format

using either the ASCII or EBCDIC character sets, without any formatting controls. OIT will support the transfer of such files between computer systems, and will provide only the capability to transform the character sets between ASCII and EBCDIC as appropriate. No other transformation capabilities will be provided, and no capability to print on OIT-supported printers is guaranteed.

5. Test Standard

5.1 Compliance with the DCA standard will be tested by means of the DisplayWrite PC word processor, an IBM product that implements DCA. Exchange of DCA documents with Displaywrite with no loss of information will be the benchmark for judging DCA compliance of other products.

6. Applicability of the Standard

6.1 This standard is applicable to all transfers of document data between OIT mainframe computer systems and other computer systems, including mainframe, office-level and workstation-level computer systems. The capability to carry out such exchanges using the DCA format is required.

6.2 This standard restricts the acquisition of printers that are connected to OIT mainframe computer systems to those that can print documents in DCA format. Every printer acquired must either be equipped to print DCA, or a printer driver that allows the printer to print DCA format documents must be written before the printer can be connected to OIT systems.

6.3 This standard restricts the acquisition of word processing hardware and software that is connected to OIT mainframe computer systems, and the development of such hardware and software, to products that can produce documents in DCA format. No word processing hardware or software can be connected to OIT mainframe computer systems that does not have the capability of producing DCA format documents, unless a transformation program to transform the product of such hardware or software is provided in advance of installation.

6.4 There are two alternate formats for document transfer that are permitted, in addition to DCA, which is required. The alternate forms are native form and text form. Native form is the file created by a hardware or software word processor for its internal use. Typically these files are undocumented, and not readily translatable into other formats. OIT will support native format exchange of documents between word processors of the same type. The second optional format is text. If a document is formatted as a flat ASCII or EBCDIC text file, OIT will provide the ability to transfer such a file between systems, including character translation.

6.5 Cable traffic that arrives by means of the narrative text network that conforms to established message formats is exempt from this standard.

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OIT Standard
Document Interchange Format

6.6 Existing connections that do not comply with this standard are exempt from compliance until major upgrades to those facilities are made. When a major upgrade is made to any connection that is exempt from this standard, that connection must be brought into compliance.

6.7 New connections with OIT systems for document exchange will not be implemented unless the connecting systems have the capability to furnish documents in DCA Revisable Form Text format.

7. Effective Date

7.1 This standard is effective immediately.

8. Implementation

8.1 All OIT components are responsible for conforming to this standard during the development and installation of new systems.

8.2 OIT will establish appropriate validation criteria and provide a point of contact for certifying product compliance with this standard.

8.3 OIT will maintain a list of hardware and software that is known to conform with this standard.

8.4 OIT will furnish programs to transform in both directions between Waterloo Script and Revisable Form DCA, and between ASCII text and EBCDIC text.

8.5 OIT will furnish programs to support the printing of documents in DCA format on all OIT-supported printers.

9. References

9.1 Document Content Architecture, Revisable-Form-Text Reference, IBM Publication # SC23-0758-0.

9.2 Document Content Architecture, Final Form Text Reference, IBM Publication # SC23-0757-1.

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OIT Statement of Direction
Terminal and Workstation Protocol

11/4/86

1. Summary

1.1 This is the OIT statement of direction for protocols used to connect (interactive) terminals and intelligent workstations to OIT mainframe computer systems. OIT's direction is toward IBM's 3270 protocol.

1.2 This direction is limited to terminal and workstation connections, and does not apply to connections between OIT mainframe computer systems and another computer system, where that computer system is providing services other than the support of a single user.

1.3 The need for this statement of direction is discussed, candidate directions are reviewed, and the selected approach is presented. Applicability of this statement of direction and OIT implementation responsibility are given.

2. Need for this Statement of Direction

2.1 The use of a standard protocol for connection of terminals and workstations to OIT mainframes will provide OIT customers with ease of connection to OIT systems, improved accessibility to application software and improved interoperability of Agency ADP equipment.

2.2 OIT is carrying out the NEWS project, to provide advanced functions that incorporate cooperative processing between workstations and mainframes. These capabilities require the standardization of the workstation-mainframe interface.

3. Candidate Directions

3.1 OIT offers TTY terminal connections to its mainframes, at a data rate of up to 9600 baud (roughly 9600 bits per second). Support is provided for asynchronous TTY terminals that operate as "glass Teletypewriters" and through the use of the Conversational Access Monitor (CAM) that supports full-screen operation and menu generation for Delta Data terminals.

3.2 Most IBM mainframe installations do not use TTY connections to their terminals; typically they use 3270 terminals, that operate at speeds up to 2.4 megabits per second, more than 250 times as fast as TTY connections. The bulk of application software available for IBM mainframes supports only 3270 terminals. The OIT-implemented 3270 simulator that allows the use of 3270-based application software with Delta Data terminals is suitable only as a bridge.

3.3 With the arrival of the Intecom PBX and its support for 3270 connections without a requirement for a separate coaxial cable to each terminal, it is now feasible for the Agency to adopt the terminal interconnect method that is in the industry mainstream, that will make available the widest variety of terminal, workstation and mainframe hardware and software.

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OIT Statement of Direction
Terminal and Workstation Protocol

4. Direction

4.1 OIT's direction is toward the 3270 protocol for connecting terminals and workstations to OIT mainframe computer systems.

4.2 OIT has also established IBM's System Network Architecture as a direction; when SNA is running on OIT networks, then the protocols of SNA to support remoteclusters of terminals and workstations will become available for the support of terminals and workstations in remote locations.

5. Applicability

5.1 This statement of direction is provided so that OIT customers and vendors can understand OIT's future direction and make appropriate plans for future systems that interface with OIT mainframe computer systems.

5.2 OIT's intention is to define an interface standard for 3270 connections and to rely on that interface for the interconnection of all terminals and workstations that are connected to OIT mainframe computer systems.

5.3 It is OIT's direction to move away from the use of CAM by discontinuing the acquisition of terminals that require CAM, ceasing the development of new CAM applications, advocating the use of 3270 applications and discontinuing the support of CAM when the present base of applications that require CAM has been replaced.

5.4 The connection of new terminals and workstations that do not comply with applicable OIT standards may require an engineering effort which may include the acquisition and installation of a protocol converter. Connection of such devices can be dealt with only on an case by case basis, as the need for such conections arises. In any case, such connections should not include support for CAM.

6. Implementation

6.1 OIT will develop a standard for 3270 interfaces to terminals and workstations. All OIT components are responsible for conforming to this standard during the installation and maintenance of workstations and 3270 terminals.

7. References

7.1 IBM 3270 Information Display System Introduction, GA27-2739.

7.2 IBM 3270 Information Display System Data Stream Programmer's Reference, GA23-0059

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OIT Standard
3270 Protocol for Terminals and Workstations

10/27/86

1. Summary

1.1 This standard defines the protocols used to connect (interactive) terminals and intelligent workstations to OIT mainframe computer systems when the 3270 protocol is employed. The standard is the IBM Distributed Function Terminal (DFT) Category A protocol for 3270 terminals.

1.2 This standard is limited to terminal and workstation connections. The standard does not apply to computer-computer connections where the computer is providing services other than the support of a single user, and does not apply to a single connection of a network of workstations as a cluster of terminals.

1.3 The need for this standard is discussed, applicable potential standards are reviewed, and recommended standards are presented. The applicability of the standard and OIT implementation responsibility are given.

2. Need for this Standard

2.1 OIT has an established direction to use the 3270 protocol to connect terminals and workstations to OIT mainframe computer systems (see the OIT Statements of Direction on Terminal and Workstation Connection and Network Architecture). There are several variations within that protocol; therefore the particular protocol to be employed must be identified.

3. Candidate Standards

3.1 There are two modes of 3270 protocol that are used to attach workstations and terminals to controllers, the Control Unit Terminal (CUT) mode and Distributed Function Terminal (DFT) mode. DFT is a more recent product; all recent functional enhancements to 3270 terminals made by IBM are supported only by DFT mode. DFT also allows more terminals to be supported from a single controller, and allows file transfers to be made twice as fast as CUT. Both DFT and CUT enjoy wide support by vendors other than IBM.

4. Standard

4.1 In order to connect a terminal or workstation to OIT computer centers, OIT approval for the connection must be obtained. Only OIT can make or change physical connections to OIT networks.

4.2 The IBM 3270 DFT Category A terminal protocol is the standard. Although this protocol is a specific product from one vendor rather than a standard promulgated by an official standard organization, its adoption will not increase our reliance on IBM as a supplier, because of the wide support for this protocol from vendors other than IBM.

4.2.1 Since OIT's strategic direction is to adopt the SNA Network

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OIT Standard
3270 Protocol for Terminals and Workstations

Architecture (see the Network Architecture Statement of Direction),
terminals and workstations must be able to use the DFT protocol
when connected to a SNA or a non-SNA controller.

4.2.2 A further requirement for terminals and workstations that use
the 3270 DFT protocol is that they be compatible with Intecom's
LANmark (3270) feature. That is, such devices must be supported by
by Intecom, which means it must be included on Intecom's list of
devices certified for LANmark 3270.

5. Test Standard

5.1 The test standard for verifying compliance with this standard is the
set of tests conducted by Intecom before equipment is placed on their
list of supported interconnections.

6. Applicability

6.1 This standard is applicable to connections of any terminal or
workstation with OIT's mainframe computer systems.

6.2 Conformance to this standard will allow a workstation or terminal to
access only 3270 applications. CAM applications are supported only for
workstations that meet this standard and also run a PC implementation of
CAM that is compatible with mainframe CAM support, and for terminals
that are compatible with CPCAM, GIMCAM and OSCAM.

7. Effective Date

7.1 This standard is effective immediately.

8. Implementation

8.1 All OIT components are responsible for conforming to this standard
during the installation and maintenance of workstations and 3270
terminals.

8.2 OIT is responsible for maintaining a list of workstations and
terminals that are known to conform with this standard.

8.3 OIT will establish appropriate validation criteria and provide a
point of contact for certifying product compliance with this standard.

9. References

9.1 IBM 3270 Information Display System Introduction, GA27-2739.

9.2 IBM 3270 Information Display System Data Stream Programmer's
Reference, GA23-0059

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OIT Standard
Database Management System Data Language

1. Summary

1.1 This is the OIT standard for the data language interface to database management systems for Agency use on mainframes, minicomputers and microcomputers. The standard is SQL, an acronym for "Structured English Query Language". The interim definition of SQL is provided by IBM's database system products, SQL/DS (for "Structured Query Language Data System") and DB2 (Database 2). When an ANSI standard is developed that has sufficient functionality to meet Agency needs, a revised version of this standard will be issued, utilizing the ANSI standard as the definition of SQL.

1.2 The need for a standard is discussed, applicable potential standards are reviewed, and the recommended standard is presented. The applicability of the standard and OIT implementation responsibilities are given.

2. Need for this Standard

2.1 The Agency runs a variety of computer systems of differing capacity; mainframes are available Agency-wide, microcomputers are used by individuals, and there are a few minicomputers used by groups of users. Database management systems are commonly employed on computers of all sizes; indeed, the collection and analysis of data pervades intelligence activities.

2.2 The Agency presently employs a variety of incompatible database systems for different applications. Some systems that are currently run include GIMS, IDMS/R, INQUIRE, NOMAD, DBASE, RAMIS, RDMS and SQL/DS. These systems have different interfaces, and there are numerous problems caused by the number of different database systems that OIT presently supports:

> 2.2.1 there is little or no ability to relate information stored by one database system to information stored by another system;
>
> 2.2.2 it is difficult to migrate databases and database applications from one system to another; since workstations are computer systems that can run database systems themselves, this problem will become much more severe when workstations are in widespread use;
>
> 2.2.3 there is no commonality of user access techniques between systems, so that a customer who learns how to access a database on

one system cannot necessarily access a database on another system;

2.2.4 OIT consulting and programming resources are challenged by the need to support a large number of conceptually different data languages.

2.3 OIT has plans to develop cooperative processing for workstations and

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mainframes, that will ultimately allow the use of database on the mainframe in conjunction with databases stored on workstations. Clearly, such a capability must be based on some standard interfaces to the database systems that are used on both machines.

2.4·It is desirable for a database user to be able to use a common set of techniques for database access, whatever type of computer system is involved. Thus, a user who has access to database systems on workstations, departmental and mainframe computers would have only one set of access techniques to learn.

2.5 Similarly, if a database initially created on a personal computer becomes too large for the PC and needs to be migrated to a mainframe in order to offer wider access and better performance, then the users of that database would not have to learn new access techniques. Although the use of a standard data language will not provide for automatic migration of databases, the commonality of design approach between two database systems that implement the same data language will make migration much easier than it is between systems with completely different data languages, and once the migration is complete the migrated database can be accessed by the same queries that were used for the original database.

2.6 There is also a need to be able to develop databases independently and then integrate them if subsequent events or intelligence needs require that information in one database be used in conjunction with information stored in another, separately-implemented database. A common data language, and the common design approach implied by the common data language, can make such integration possible to achieve in situations where it would otherwise be completely unachievable; however, such integration can still be a difficult task.

2.7 Although the SQL language does not provide a method for the transfer of data between different database systems, it does provide the opportunity to define such a standard method of transfer based on the SQL language. Specifically, such a data transfer standard can be defined that consists of a the sequence of SQL statements that will create tables of identical structure, content and access privileges on the target system that existed on the source system.

3. Available Standards

3.1 In the area of data languages that can be used as user interfaces or as application interfaces, industry direction is clear: SQL. IBM has adopted SQL for their database systems that run on VM and MVS, the ANSI committee working on a relational data language has reported out a draft standard that is SQL, and virtually every database system in development today is based on the use of SQL. Recently, Cullinet, Software AG and Applied Data Research, all major independent DBMS vendors, have announced their intention to support SQL.

4. Standard

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4.1 The standard is the SQL language. The interim definition of SQL is the implementation of IBM's products, SQL/DS and DB2. This standard will be in effect until there is a final ANSI standard with suitable functionality; at that time, the ANSI standard will be used as the SQL definition.

5. Test Standard

5.1 The test standard for verifying compliance with this standard is SQL/DS, as installed on OIT VM systems.

6. Applicability

6.1 This standard is applicable to personal computers, minicomputers and mainframe computers. The only database systems that will be sanctioned and fully supported by OIT are those that implement a SQL interface.

6.2 Customers who utilize OIT assistance in selecting a database system for an application should be advised to choose a system that implements SQL, since long-term continued support can be assured only if SQL is chosen. Similarly, a choice of SQL will allow the integration of mainframe and PC database processing.

6.3 OIT development projects are required to use only database systems that implement SQL for all new application developments. Present applications, and applications presently under development, are exempt from this standard; however, if major enhancements are made to present applications, then the standard applies.

6.4 If a database system in use by an OIT development project offers a SQL interface and a non-SQL interface, the OIT project is required to use the SQL interface for all database access.

6.5 Where major commitments have been made to database systems that do not implement SQL, a formal commitment should be sought from the vendor to implement SQL, and the use of that system should be oriented toward conversion to the SQL features when they become available. If the vendor will not commit to the adoption of SQL, eventual migration to another database system should be considered.

6.6 This standard does not require or imply that support for noncomplying database systems or applications will be dropped immediately. Issues of support and conversion are the responsibility of the OIT components who carry out such activities, and are outside the scope of this standard.

7. Effective Date

7.1 This standard is effective immediately.

8. Implementation

8.1 OIT will maintain a list of hardware and software that is known to

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conform with this standard.

9. References

9.1 Database Language SQL, January 1986, ISO PC97/FC21/WG3-N96, ANSI X3H2-86-2, American National Standards Institute, New York, N.Y.

9.2 IBM Database 2 Reference Summary, SX26-3740, IBM Corporation, Armonk, N.Y.